HN Math III: Unit 3 – Day 2 **Name** _____

POLYNOMIAL & ZEROS HOMEWORK

In 1-6, determine which functions are polynomials. For those that are, state the degree. For those that are not tell why not.

1.) $f(x) = 5x^2 + 4x^4$

Degree 4 polynomial

2.) $h(x) = -3 + \frac{1}{2}x$

Degree 1 polynomial (linear)

3.) $f(x) = (x-2)^5$

Degree 5 polynomial

4.) $f(x) = x^4 + 2$

Degree 4 polynomial (quartic)

5.) $f(x) = (x+2)(x-7)^2$

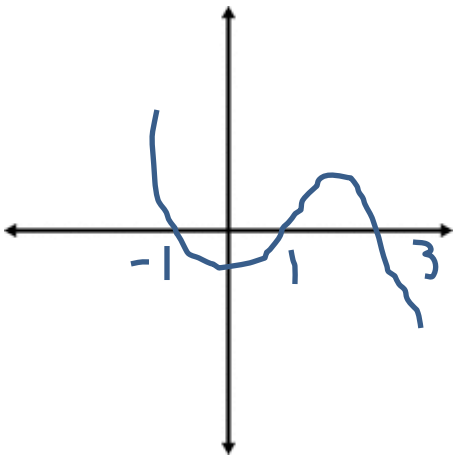
Degree 3 polynomial (cubic)

6.) $f(x) = x(x-1)^2(x+3)^3$

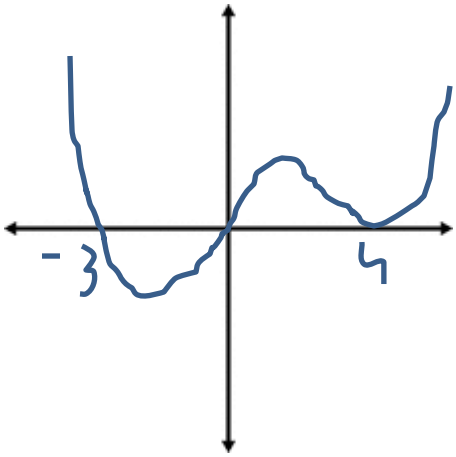
Degree 6 polynomial

In 7-8, form a polynomial whose real zeros and degree are given.

7.) Zeros: -1, 1, 3; degree: 3; negative end behavior

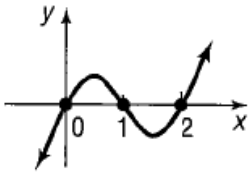


8.) Zeros: -3, 0, 4; degree: 4 (the "4" zero has a multiplicity of 2), positive end behavior



In 9, find a polynomial function that might have the given graph. d

9.)



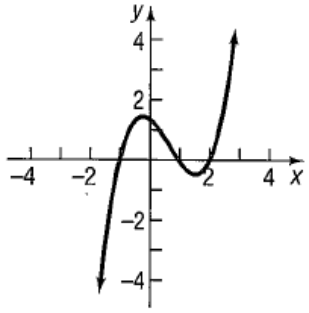
y = x(x – 1)(x – 2)

In 10-12, answer each part for the given polynomial.

10.) $f(x)=3(x-7)(x+3)^2$	11.) $f(x)=-4(x+1)(x-2)^3$	12.) $f(x)=(x-5)^3(x+4)^2$
a.) List each real zero and its multiplicity. **x = 7** **x = -3; multiplicity 2**	a.) List each real zero and its multiplicity. **x = -1** **x = 2; multiplicity 3**	a.) List each real zero and its multiplicity. **x = 5; multiplicity 3** **x = -4; multiplicity 2**
b.) Determine whether the graph crosses or touches the x-axis at each x-intercept. **Crosses at 7, touches at -3**	b.) Determine whether the graph crosses or touches the x-axis at each x-intercept. **Crosses at -1, crosses at 2**	b.) Determine whether the graph crosses or touches the x-axis at each x-intercept. **Crosses at 5, touches at -4**
c.) Determine the maximum number of turning points on the graph. **At most, 2 turning points (max/mins)** d.) Determine the end behavior. $x \to \infty, y \to \infty$ $x \to -\infty, y \to -\infty$	c.) Determine the maximum number of turning points on the graph. **At most, 3 turning points. (This one really only has 1 because of the repeated zero.)** d.) Determine the end behavior. $x \to \infty, y \to -\infty$ $x \to -\infty, y \to -\infty$	c.) Determine the maximum number of turning points on the graph. **At most 4 turning points. (This one really only has 2 because of the repeated zeros)** d.) Determine the end behavior. $x \to \infty, y \to \infty$ $x \to -\infty, y \to -\infty$

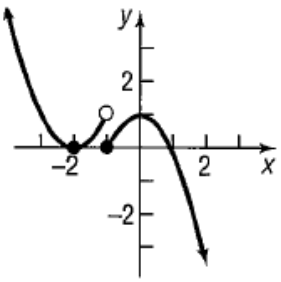
In 11-12, identify which of the graphs could be the graph of a polynomial function. For those that could, list the real zeros and state the least degree the polynomial can have. For those that could not, say why not.

13.)



y = (x + 1)(x – 1)(x – 2)
Least possible degree is 3 (cubic)

14.)



NOT a polynomial because it is broken.